Claims

1. A fuel injection valve for internal combustion engines, having a valve body (1) in which a bore (3) is disposed, on whose end toward the combustion chamber a conical valve seat (9) is embodied in which at least two injection ports (11) are disposed that connect the bore (3) to the combustion chamber, and having a valve member (5), which is guided in the bore (3) and by imposition of pressure by fuel on a pressure face (13) embodied on the valve member (5) is axially movable counter to a closing force aimed at the valve seat (9) and which has a valve member shaft (205), oriented toward the valve seat (9), between which shaft and the wall of the bore (3) a pressure chamber (19) that can be filled with fuel is embodied, which valve member (5), on its end toward the combustion chamber, has a valve member tip (7) on which a first conical face (30) and a second conical face (32), adjoining the first conical face (30) toward the combustion chamber, is embodied, and the cone angle (α) of the first conical face (30) is less, and the cone angle (β) of the second conical face (32) is greater, than the cone angle (γ) of the valve seat (9), and having an annular groove (35), extending all the way around the valve member tip (7), the first groove edge (38) of which is located in a radial plane to the axis of the valve member (5) and on the first conical face (30), and whose second groove edge (39) is located in a radial plane to the axis of the

valve member (5) and on the second conical face (32), and the first groove edge (38) of the annular groove (35) is embodied as a sealing edge, which in the closing position of the valve member (5) comes into contact with the valve seat (9) upstream of the fuel flow to the injection ports (11), characterized in that on the second conical face (32) of the valve member tip (7), an additional annular groove (42) is embodied, which both in the closing position and in the open position of the valve member (5) at least partly covers the injection ports (11).

2. The fuel injection valve of claim 1, characterized in that the cross section of the annular groove (42) is greater than or equal to the cross section of an injection port (11).

3. The fuel injection valve of claim 1, characterized in that a first differential angle (δ_1), located between the first conical face (30) and the valve seat (9), is smaller than a second differential angle (δ_2), located between the valve seat (9) and the second conical face (32).

4. The fuel injection valve of claim 3, characterized in that the first differential angle (δ_1) and the second differential angle (δ_2) amount to less than 1.5°.

5. The fuel injection valve of claim 1, characterized in that the cone angle (γ) of the valve seat (9) amounts to from 55 to 65°, preferably approximately 60°.

6. The fuel injection valve of claim 1, characterized in that the groove edges (44; 46) of the additional annular groove (42) are located in radial planes to the valve member axis (50) of the valve member (5).

7. The fuel injection valve of one of claims 1-4, characterized in that the conical face adjoining the groove edge (46), remote from the combustion chamber, of the additional annular groove (42) partly covers the injection ports (11) in the closing position of the valve member (5).

8. The fuel injection valve of claim 1, characterized in that the injection ports (11) are located in a common radial plane relative to the valve member axis (50).

9. The fuel injection valve of claim 1, characterized in that the groove edges (44; 46) of the additional annular groove (42) and the injection port outlets are in a plane that is inclined to the radial plane of the valve member axis (50).

10. The fuel injection valve of one of the foregoing claims, characterized in that at least one longitudinal groove (55) connecting the two annular grooves is embodied on the conical face disposed between the annular groove (35) and the additional annular groove (42) and extends along jacket lines of the second conical face (32).

11. The fuel injection valve of claim 10, characterized in that more than one longitudinal groove (55) is embodied on the second conical face (32), and these longitudinal grooves are distributed uniformly over the circumference.

12. The fuel injection valve of claim 10, characterized in that all or some of the longitudinal grooves (55) extend at an incline to the jacket lines of the second conical face (32).